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COLOMBIAN FRESHWATER CRAB NOTES

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These notes are a rather belated and unorthodox accounting of a number of very interesting freshwater crabs sent to the U. S. National Museum for identification in 1940-41 by Brother Niceforo Maria, Director of the Museum of the Instituto de LaSalle, Bogotá, Colombia, who had collected them from as far south at Puerto Asís, Int. de Putumayo, not far from the Ecuadorian border, to Cúcuta and vicinity, Norte de Santander, close to the Venezuelan border. The specimens in the Niceforo collection are commented upon below under their current species name headings. Among them were found four new species and a new subspecies, of which all but the one described in this paper were published upon by Dr. Gerhard Pretzmann (noted below). A number of new records of occurrence for these Colombian freshwater crabs are here established.

Concluding these notes are some remarks on variation in the carapace armature of *Valdivia* (*Valdivia*) *piriformis* Pretzmann, and, though not represented in the Niceforo material, of *Trichodactylus* (*Dilocarcinus*) *pictus* (A. Milne-Edwards, 1853) (*<Holthuisia pictus*).

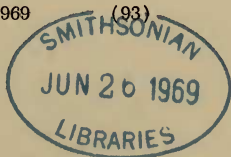
The figures of the gonopods and carapaces of most of the species listed or discussed are, in the case of the gonopods, unless otherwise stated in the figure legends, three times natural size, and in the case of the carapaces close to natural size.

FAMILY TRICHODACTYLIDAE

Valdivia (*Rotundovaldivia*) *niceforoi* (Schmitt and Pretzmann, 1968)

Figure 1, a-d

The first of the new species is a trichodactylid which, in the character of its gonopods, is unlike any member of the family previously



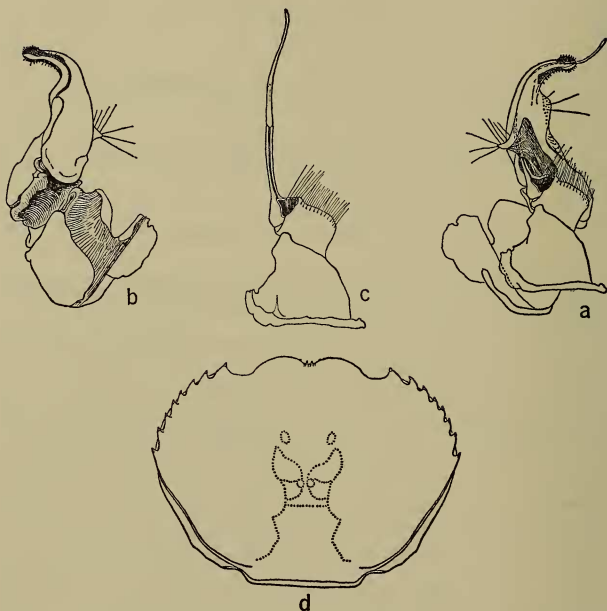


FIG. 1. *Valdivia* (*Rotundovaldivia*) *niceforoi* (Niceforo No. 4; USNM 112117). a. right gonopod, posterior view. b. same, reversed, anterior view. c. second right gonopod. d. carapace.

known. Dr. Gerhard Pretzmann, of the Naturhistorisches Museum, Vienna, at the time engaged in reviewing the taxonomy of American freshwater crabs, visited Washington in October 1964 for the purpose of examining pertinent material in the National Museum.

He became much interested in this new species, as well as in the other identifications that I had made of the Niceforo crabs, and wished particularly to include mention of the new species in a forthcoming account of his recent studies. Because of procrastination on my part and preoccupation with more pressing commitments, I acceded to his publishing it with the understanding that it be named for Brother Niceforo.

Dr. Pretzmann subsequently published a diagnosis and brief description, in the authorship of which he included me: "*Trichodactylus* (*Valdivia*) *niceforei* Waldo L. Schmitt and Gerhard Pretzmann" [1968b, p. 61]. The specific name, however, should be spelled *niceforoi*.

Though I would have wished it otherwise, Dr. Pretzmann selected

for the type a specimen that Brother Niceforo had sent to the Paris Museum at an earlier date: "Typus: ♂ ♀ 32.1 mm Cpxlg. Fundort: Pamplona. M. Nicefore coll. 1936." Whether that sex-questioned specimen was a damaged male or one from which the gonopods were missing was not made clear.

Not quite two months later Dr. Pretzmann removed the species to his newly created subgenus *Rotundovaldivia* of the genus *Valdivia* [1968c, p. 73].

Inasmuch as the Niceforo specimen in the U. S. National Museum that had alerted me to this new species is no more than a shade larger than the one that Dr. Pretzmann designated the type of the species, 34 as compared to 32.1 mm in median length, I am moved to contribute here a somewhat more detailed description of the species based on the National Museum specimen, together with some remarks on three other males and two females collected by Brother Niceforo while resident for a time in the Colegio del Corazon, Cúcuta, Norte de Santander.

Description of my specimen of V. (R.) niceforoi, 34 mm in median length of carapace from Cúcuta, Norte de Santander (Niceforo No. 4, USNM 112117):

Carapace longitudinally very convex, more oval than suborbicular, about three-fourths as long on median line as greatest width across tips of posterior pair of lateral spines. Front bilobed, margins of lobes minutely roughened with fine granules, as is general surface of the carapace; median emargination of front about one-third as deep as the orbit in dorsal view measured back from a line joining the anterior margins of the unarmed frontal lobes; at its middle the frontal emargination is armed with a pair of sharp, narrowly triangular teeth or spines, on either side of which there is a small tooth or tuberculiform denticle; viewed from below these denticles are more conspicuous, suggestive of a second incipient pair of frontal spines. The adjacent margins of the frontal lobes, furthermore, tend toward being tuberculated, due, apparently, to an enlargement of the granulations of the carapace as they reach the frontal margin.

Outer angle of orbit armed with a sharply triangular tooth, about as far removed from the first or anterior of the seven anterolateral spines as the last is from the one that just precedes it; the first anterolateral tooth is about as far removed from the second as the fifth is from the sixth; interspaces between third, fourth, and fifth spines subequal. Ventral margin of the orbit armed with five somewhat medially directed blunt spines or elongate denticles, of which the innermost is the largest (tip of the corresponding one on the left side is broken off); thickened margins of the median projection of the epistome at apex of projection (in dorsal view) appear to form either side of the median line a low swelling; anterolateral angle of buccal frame armed with six somewhat elongate-tuberculiform denticles on the right side, five on the left.

The chelae are markedly unequal in the unique type. The right one is vastly the larger, the perpendicular (greatest) height being more than

twice that of the smaller left chela; in the major chela the length of sinus or gape between the fingers is about four-fifths of the distance back to midpoint of the posterior margin of the palm proper; in the smaller hand the gape is a little greater than the corresponding length of the palm; upper margin or surface of either palm flattened, bluntly angulated where it passes over into inner and outer faces; ventrally the palmar margin is evenly rounded off. Carpus of either cheliped carries but a single stout spine on the inner margin, arising about one-third the length of the carpus from the anterior end; it is a little more slender and sharper on the minor carpus; anterior margin of upper surface of merus armed in the major cheliped only with a low spine, or tubercle with acute tip at about one-third of the length of the margin anterior to the suture separating this joint from the ischium, outer margin of merus with a similar spine about one-fourth the length of the joint proper from the anterior end; merus of minor cheliped armed like that of major one, but the spines are relatively longer, more slender, and sharper.

Dactylus of ambulatory legs elongate, triangular in lateral view, bluntly tricarinate; dorsal carinae more or less obscured by dense fringes or brushes of short hairs; inner and outer faces flattened and slightly concave or excavate; ventral margin flattened and bluntly angulated where it passes over into inner and outer faces of the dactyl; lower surface and marginal angulations of dactyl hidden by a double fringe of hair several times as long as the brushes fringing the upper margin of the dactyl; the tips of all the dactyls are rather worn off.

First abdominal somite almost wholly concealed by the carapace, second very narrow, third also narrow but twice as long (on median line) as second; third to sixth somites fused together, although all suture lines externally are very sharply and distinctly marked, so much so that all somites to all appearances are freely articulated with one another; free seventh somite triangular, lateral margins concave, posterior extremity rounded off; this somite is a little more than half as long as wide at base.

The anterior pair of gonopods are unique among those of trichodactylid species that so far I have had the opportunity of examining. Much contorted, their distal two-thirds constitutes a hollow sheath or tube through which the slender, almost setiform, second pair of gonopods projects as much as 2 mm. The inner and underside of the twisted terminal hooked portion of the anterior pair of gonopods is furnished with a darker colored, minutely spined or prickly area, which, as viewed when in position, reappears above on the distal end of the anterior margin of the "hook" of the gonopod.

Measurements: The median length of the carapace of the specimen described above, measured from between the pair of spines in the frontal emargination, is 34 mm; the width over the apices of the anterolateral spines is 45.2 mm; width between apices of spines arming outer angle of orbits 25 mm; the dorsal margin of major palm 19 mm long, the mov-

able finger 27 mm; the ventral margin of hand from articulation to tip of immovable finger 43 mm. The corresponding measurements of the minor chela are 10.0, 18.5, and 28.5 mm. The terminal seventh abdominal somite is 6 mm long by 11 mm wide.

Remarks: The five other specimens (three ♂♂ and two ♀♀) of this species at hand conform in general appearance and in most particulars with the specimen described above.

The largest of the three males is 32 mm long and 41.8 mm wide; the frontal margin is armed much as in the above described male; the right and left lower orbital margins are armed with 4 and 6 spines respectively; the corresponding lateral angles have on the one side 3 spines, with perhaps the indication of a 4th spine, and 5 spines on the other.

The second male is soft (recently moulted) and has a fractured carapace; it measures 27.4 to 28 mm long by about 35 mm wide; front much as in type; 4 and 5 orbital spines; and 5 spines at either angle of buccal frame. The third and smallest male is 22.2 mm long by 29.9 mm wide; the pair of spines in the median emargination of the front are relatively a little more separated than in the other specimens; orbital spines 5 either side; at buccal angles, 4 and 5.

In general, the female of the species differs but little from the male. The female carapace does not taper as much posteriorly, and so in outline is a bit more squarish than that of the male. The armature of the median frontal emargination, which in the female tends to depart from the male norm of two teeth, is perhaps a variable character, to judge from the two females at hand; in the larger one, as noted above, the emargination is armed with three teeth, in the smaller specimen with one only.

The chelae of the females are much less developed than those of the males. On the other hand, the spines with which the several joints of the chelipeds are armed are more prominent, more slender, and very sharp. Above the inner articulation of the movable finger of the major chela there is a short, conical, acute spine; in the largest of the three male specimens there is just an inconspicuous, low, blunt swelling in this position; only the smallest male has a conical, but less slender, spine than in the female. The corresponding spine of the minor chela is conical-tuberculiform in the larger males and in the smallest one more slender and more sharply pointed, as is the similarly placed spine in the females.

The larger of the two females is about the size of the described male, 34.2 mm long by 42.1 mm wide. In the frontal emargination there are three sharp spines, a fairly long, more or less centrally placed spine, with a slightly smaller one about two-thirds the size of the median spine either side of it; the denticle remarked in the large described male either side of the spines arming the frontal emargination is of good size and more conspicuous than in any of the other specimens at hand; orbital spines are five either side; at buccal angles right and left, 5 and 4. The carapace of the smaller female measures 33 by 41.6 mm. In this

specimen the frontal emargination is armed with but a single spine in place of the usual median pair; a pair of frontal denticles, as in the other specimens, is present.

Valdivia (Rotundovaldivia) niceforoi cucutensis Pretzmann 1968

As remarked above, the more or less roughened margins of the frontal emargination of our specimens either side of the aforementioned denticles verge on becoming tuberculiform. It is not inconceivable that with further development such "tubercles" could become more or less spine-like and so enter into a count of what might be considered a part of the spination of the front or its emargination. I am inclined to believe that something of this sort may have encouraged Dr. Pretzmann to describe as a new subspecies a specimen he had seen in the Basel Museum as *Valdivia (Rotundovaldivia) niceforei* [sic] *cucutensis*, "Holotypus: ♂ 33.5 mm Cpxlg., Museum Basel, Nr. 763-b. Fundort: Columbien, Cucuta" [1968, p. 73].

Valdivia (Valdivia) serrata White, 1847

Figure 2, a-e

In validating the genus *Valdivia* White, 1847, of which *Valdivia serrata* is the type, Pretzmann [1968c, pp. 71, 73] set up two subgenera, *Valdivia* and *Rotundovaldivia*, the latter with "Typus subgeneris: *T. bourgeti*." In it, along with several other species, he placed *V. (R.) niceforoi*, described above. For the subgenus *Valdivia*, to which he assigned "*V. devillei*" and several other known species, he described two new subspecies of *serrata* and two new species: *V. (V.) torresi* from "Kolumbien, La Regla" and *V. (V.) piriformis* (discussed below) from "Cucuta." Inasmuch as no illustrations accompany any of the descriptions of these new forms of Pretzmann's, I shall not undertake to attach a subspecific name to three specimens in the Niceforo collection which I take to be *V. (V.) serrata*. All three are from the same locality: Puerto Asís, Int. de Putumayo," a male (No. 12, 48 × 55.6 mm) and two females (No. 13, 42.7 × 49.2 mm; and No. 14, 38 × 45.5 mm).

Valdivia (Valdivia) piriformis Pretzmann, 1968

Figure 3, a-e, and f-i

In the Niceforo collection were four male and five female specimens which I believed represented Dr. Mary J. Rathbun's *Trichodactylus venezuelensis*, having compared a female of similar size with the cotype female in the U. S. National Museum, making allowances for what was assumed to be variation. No males, so far as I was aware, had at that time been linked with certainty to the Rathbun cotypes. Nor was there an identified male supposedly of this species available in the Paris Museum, where the type was examined for me two years ago by Mr. Edward Davidson, of the U.S.N.M.

During his Washington visit, Dr. Pretzmann, who examined these specimens, added to each bottle a note: "*Trichodactylus (Valdivia)*

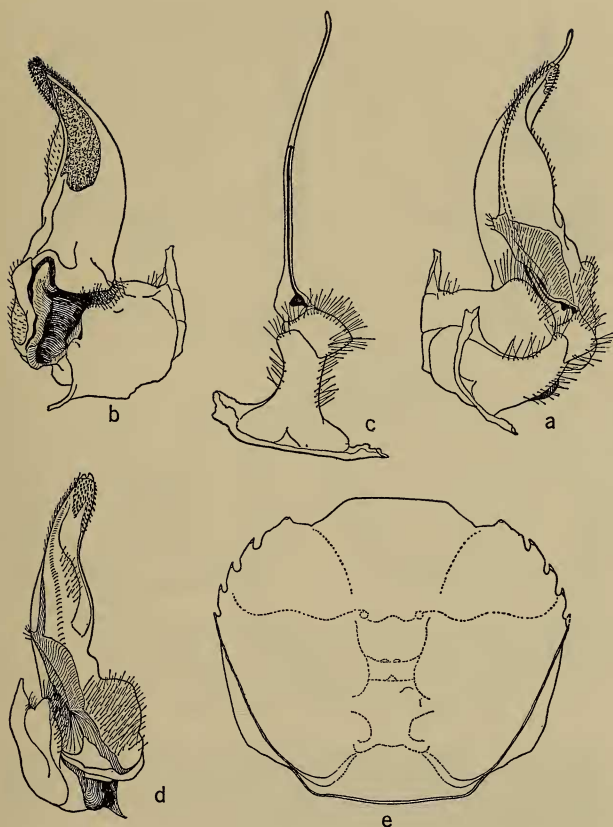


FIG. 2. *Valdivia (Valdivia) serrata* (Niceforo No. 12). a. right gonopod, posterior view. b. same, reversed, anterior view. c. same, medial view. d. second right gonopod. e. carapace.

devillei, Pretzmann, Oct. 1964," without any indication that an undescribed species might be involved. *V. (V.) devillei* (A. Milne-Edwards), by the way, had been founded on a dried specimen of a female, and, as in the case of Miss Rathbun's *venezuelensis*, Mr. Davidson found no males in the Paris Museum that had been identified with this species.

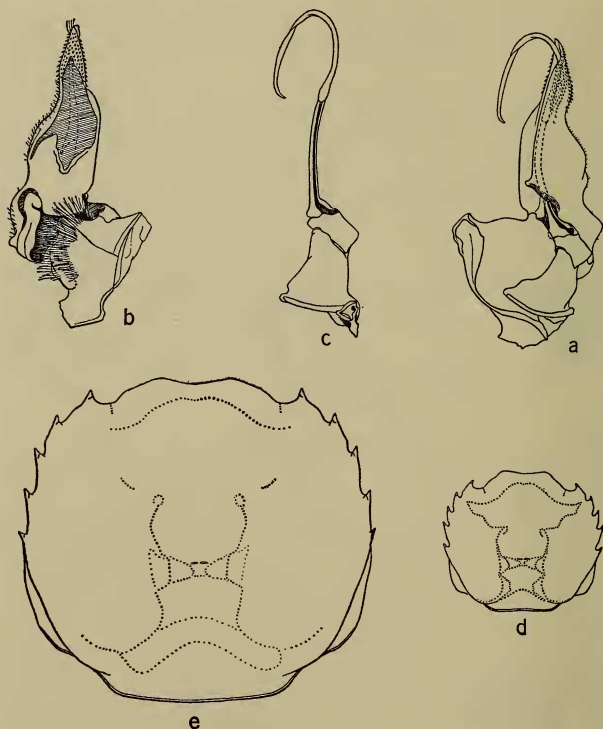


FIG. 3, A-E. *Valdivia (Valdivia) piriformis*. a. right gonopod (Niceforo No. 24), posterior view. b. same, reversed, anterior view. c. second right gonopod. d. carapace of smallest male (Niceforo No. 19). e. carapace of largest female (Niceforo No. 22).

On his return to Vienna, however, Dr. Pretzmann described his *Valdivia (Valdivia) piriformis*, "Holotypes: ♂ 48 mm Cpxlg., Mus. Washington (als *devillei* bezeichnet). Fundort: Cucuta. Nicefore coll." [1968c, p. 73].

I have no doubt that the cited type is Niceforo's specimen (No. 23) from Sardinata, northwest of Cúcuta, to which Pretzmann had added a *devillei* label; it is a male a shade over 49 mm long by 51 mm wide; two other males (No. 24) from the same locality measure 32 and 37 mm long. Niceforo's collection also includes three females 36, 37, and 40 mm

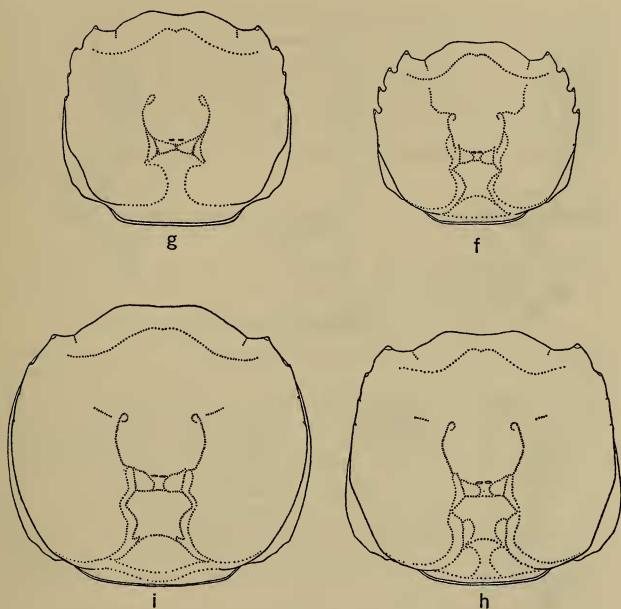


FIG. 3, F-I. *Valdivia* (*Valdivia*) *piriformis*. f. carapace (Niceforo No. 24, smaller specimen). g. carapace (Niceforo No. 24, larger specimen). h. carapace (Niceforo No. 20). i. carapace (Niceforo No. 23). As figured these carapaces approximate $\frac{1}{10}$ natural size.

long, and a small male 22 mm long, all four of which (No. 19) were collected close to the Venezuelan border north of Cúcuta; a female (No. 15) from Río Caquetá, Int. de Caquetá in the far south of Colombia (each of the foregoing specimens measures 2 mm, more or less, wider than long); and, lastly, the largest (and widest) of all the specimens (No. 22), a female 54.5 mm long by 59.2 mm wide from Puerto Salgar, Río Magdalena, Cundimarca. From the type locality, Cúcuta, also comes a male (No. 20) 44.2 mm long by 45.9 mm wide.

? *Valdivia* (*Valdivia*) *devillei* (A. Milne-Edwards, 1853)

In the Niceforo collection is a lone female which I took to be *T. (V.) peruvianus* (A. Milne-Edwards, 1869) (51.8 \times 56 mm) to which Dr. Pretzmann also attached a *devillei* label, but whether he now considers it another specimen of *V. (V.) piriformis* must await the publication of his

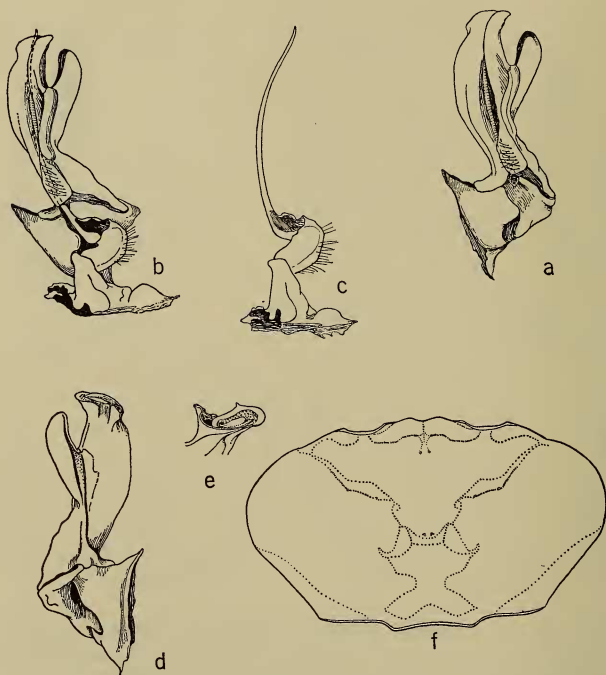


FIG. 4. *Hypolobocera* (*Neostrengeria*) *macropa* (Niceforo No. 6). a. left gonopod, posterior view. b. same, from slightly different angle. c. same, reversed, anterior view. d. second right gonopod. e. terminal, or apical, funnel of first gonopod from above. f. carapace.

more complete account of the results of his Washington visit.

Pretzmann has placed *T.* (V.) *peruvianus*, along with *T.* (V.) *venezuelensis*, in his more recently diagnosed new genus *Holthuisia*, for which he selected *Dilocarcinus pictus* A. Milne-Edwards, 1853, as the genotype [1968c, p. 74]. (The spelling *Holthuisia* in the generic heading is probably the result of a typographical error.)

FAMILY PSEUDOTHELPHUSIDAE

Hypolobocera (*Hypolobocera*) *bouvieri* (Rathbun, 1898)

Of this species there were five specimens, a male without specific locality data (35.9 × 57.1 mm), and four females; the first of the females

(No. 5, measuring 18 mm in median length of carapace \times 32 mm wide) is from San Gil, south of Bucaramanga; the second (No. 7, 46×74.8 mm) is from Sasaima, northwest of Bogotá; the third (No. 11, a badly broken specimen whose length could not be determined but which may have been between 64 and 65 mm wide) is from Río Caquité, Int. de Caquité; the fourth (No. 18, 45.2×73.2 mm) is from Chinácota, 42 kilometers south of Cúcuta. Dr. Pretzmann concurred with these identifications.

Hypolobocera (Neostrengeria) macropa (A. Milne-Edwards, 1853)

Figure 4, a-f

Of this species there was but a single specimen, fortunately a male (No. 6, 31×52 mm) from Bogotá, unmistakably this species.

Hypolobocera (Neostrengeria) guenterii (Pretzmann, 1965)

Not until notice of it appeared in print did I become aware that Dr. Pretzmann had described a third new species from among the Niceforo specimens, which he named *Strengeria (Neostrengeria) guenterii*: "Typus: ♂ 25 mm Cpxlg., U. S. National Museum. Locus typicus: Columbian 160/623, Nikiforov coll." [1965, p. 7]. This specimen (Niceforo No. 8) is from Bogotá, but, as the type is still in Dr. Pretzmann's possession, I cannot now ascertain whether I had essayed an identification of it or not. Somewhat later Dr. Pretzmann discovered that his new genus *Strengeria* was but a junior synonym of *Hypolobocera* [1968a, p. 2]. Besides the holotype, Brother Niceforo collected two other specimens (No. 9, 26.5×44.3 mm and 28.4×49.9 mm) at Pennsylvania, Caldas.

Hypolobocera (Phyllothelphusa) niceforoi new species

Figure 5, a-e

Seldom do the descriptions of American freshwater crabs, aside from the gonopods, offer the information needed for the precise determination of their species. Is it not a fact that species, subgenera, and even genera can be distinguished with certainty only on the basis of the nature and character of their gonopods? It is most unfortunate that these have yet to be adequately classified and so described that they may be keyed out and taxonomically recognized or visualized from printed (or written) text. A promising advance toward the solution of this problem was made by Dr. Alfred E. Smalley [1964a] in "A Terminology for the Gonopods of the American River Crabs." It is to be hoped that he will continue this line of investigation, for it has become more necessary than ever in view of the regrettably unillustrated reports that Dr. Pretzmann has published over the past several years in his study of various collections of South American freshwater crabs in this country and abroad. There certainly must be an evolutionary pattern or sequence of some sort in which there will be found a number of fundamental gonopod types about which all other gonopods can be grouped or arranged in rational lines of relationship.

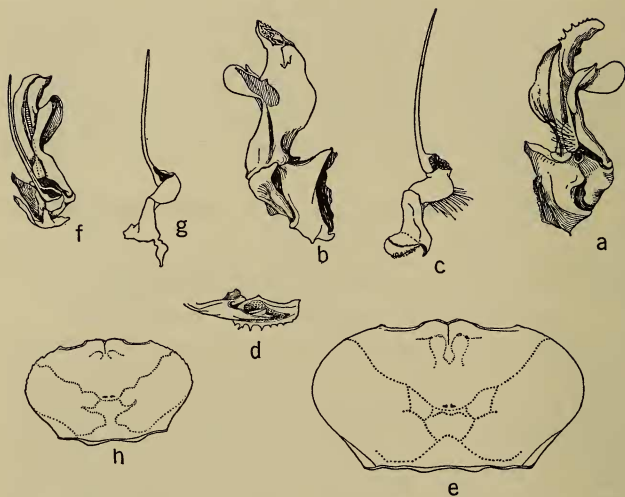


FIG. 5, A-E. *Hypolobocera* (*Phyllothelphusa*) *niceforoi* new species (USNM 125133). a. right gonopod, posterior view. b. same, reversed, anterior view. c. second right gonopod. d. terminal, or apical, funnel of first gonopod from above. e. carapace.

FIG. 5, F-H. *Hypolobocera* (*Phyllothelphusa*) *lindigiana* (USNM 20051). f. right gonopod, posterior view. g. second right gonopod. h. carapace.

Some of the gonopod definitions given by Dr. Pretzmann in his publications leave one in a quandary as to the placement of an unknown species among the many subgenera and species he named in them. For this reason I have, with some hesitation and misgivings, considered a lone male crab from San Gil, south of Bucaramanga, the type locality, as representative of Pretzmann's [1965] subgenus *Phyllothelphusa* of his genus *Strengeria* (*<Hypolobocera*). I have named it in honor of its collector and donor, and here describe it.

Description: Carapace moderately convex, finely punctate, with the "suture" defining the areolations well marked and broadly troughed; front, lightly bilobed, is about one-fourth the greatest width of the carapace; the extra-orbital angle is quite low and blunt; outer lateral margins, though appearing quite smooth, are obscurely crenulate.

The third maxilliped is almost a facsimile of the same appendage in *Pseudothelphusa lindigiana* as figured by Miss Rathbun, exognath in-

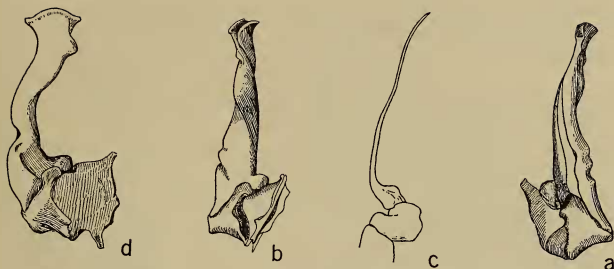


FIG. 6. *Pseudothelphusa* (*Achlidon*) *agrestis* (USNM 19487: figures $\times 5$). a. right gonopod, posterior view. b. same, reversed, anterior view. c. lateral view of first gonopod. d. second right gonopod.

cluded; its ischium also is as rectangular in appearance except that the anterior margin, if anything, is straighter.

The chelae, of which the right one is only about two-thirds the size of the larger left one, are very similar; the distal half or more of the fixed finger of the larger is missing; the movable finger is distally curved downward, and, judging from the smaller chela, the curved fingertips must have overlapped, leaving no gape between them when closed. The movable finger of the larger chela has five fairly large tuberculiform teeth, counting from the base; between the pairs of the larger teeth are smaller ones grouped in this order and number: 1, 3, 4, 1, while between the tip of the finger and the nearest one of the larger tuberculiform teeth are five more teeth alternating large and small and all much smaller than their counterparts farther back on the finger; toward the fingertip these smaller teeth progressively diminish in size.

The hand and carpus of the chelipeds are unarmed except for a blunt tooth on the carpus well in front of the middle of the margin, which is smoothly rounded off; the more or less dorsally turned flattened face of the meral joint, which is more or less triangular in cross section, on its anterior margin is armed with 64 teeth, all stout and blunt and of fair size, except for the diminutive first and last of the row; posterior margin of this joint is similarly armed, but with smaller and more numerous teeth.

The ambulatory dactyls, though not very prominently carinated, have three rows of distally directed corneous spines above, a median row with another row either side of the dorsal margin; a similar but not so regular or complete a row of these spines seems to run along each margin of the somewhat flattened "lower face" or margin of each dactyl.

As mentioned above, the gonopods of this species, barring the creation of another subgenus for their kind, perhaps best fit into the currently monotypic genus *Phyllothelphusa*, for which Dr. Pretzmann chose *Pseudothelphusa lindigiana* Rathbun, 1897, as the "Typus subgeneris." This

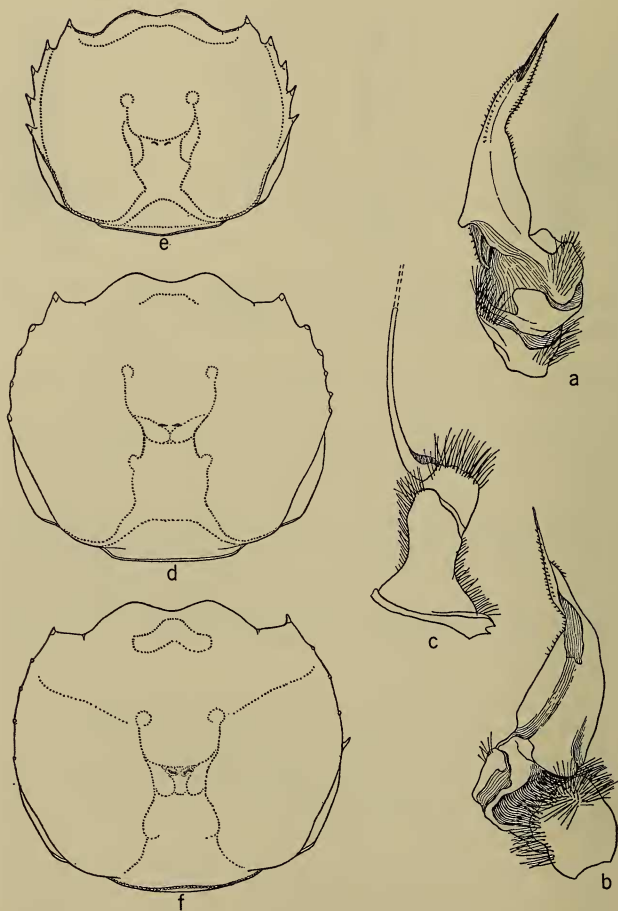


FIG. 7. *Holthuisia pictus*. a. right gonopod (USNM 119881), posterior view. b. same, reversed, anterior view. c. second right gonopod. d. carapace. e, f. carapaces of smallest and largest males (USNM 125134).

subgenus he characterized with the following [1965, p. 8]: "Definition: Gonopoden mit einer grossen, blattförmigen laterocaudalen Lobe, die apical gerichtet ist." If I am correct in this assignment, this characterization of the gonopods would have to be broadened.

Despite their general conformity to the definition, the gonopods of the species here described differ in several particulars from the gonopod sketched by Miss Rathbun for *Pseudothelphusa lindigiana*: They are more boldly developed, and the lateral lobes, though somewhat forwardly inclined, are more laterally directed; a slight extension of the distal end of a rounded ridge or weal on the "stalk" of the gonopod projects a bit over the margin of the lateral lobe, giving the lobe a mitten-shaped appearance; the most striking feature of the gonopods, however, is the spined margin of the terminal funnel, or "trichter" of Pretzmann, as the gonopod is viewed in its normal position on the sternum of the crab. Largest and more prominent of the spines arming the distal extremity of the gonopod on the uppermost margin of the more or less flattened, oblique surface of the apical funnel is a sizable pair with a tiny spine or acute denticle between them; beyond this pair are four much smaller, sharp, spiniform teeth and on the proximal side a bifurcate spine followed down the axis of the gonopod by some smaller irregularities. The spination of this funnel margin is better figured than described.

Measurements: The unique male holotype (USNM 125133) measures 22.3 mm in median length of carapace by 38 mm wide. The major left chela from the tip of the movable finger to the uppermost articulation of the hand is about 31 mm long by 11 mm deep, the dactyl or movable finger is about 3 mm longer than the 14 mm long dorsal margin of the palm; for the smaller left chela the corresponding measurements are 21, 7, 3, and 12 mm.

Although I have taken *Hypolobocera niceforoi* to be representative of the subgenus *Phyllothelphusa*, it is possible that it may fall into the subgenus *Neostrengeria*. Dr. Pretzmann diagnoses the latter [1965, p. 7] as follows: "Diagnose: Gonopoden breit, Laterallobus mit apical gerichtetem Secundärlobus; oder Laterallobus sehr breit und sein Vorderrand etwas apical vorgezogen," and takes *Pseudothelphusa macropa* Milne-Edwards, 1853, as the "Typus subgeneris." He also assigns his *Hypolobocerus guenteri* to *Neostrengeria*. The spiny armature of the gonopodal funnel margin, however, enables one to separate my *Phyllothelphusa* from *Neostrengeria* at first glance. In *H. guenteri* the carpal spine of the chelipeds is prominent and acute, and is situated at about the middle, or just behind the middle, of the carpal margin on which the spine sits; in *H. niceforoi*, on the other hand, there is no sharp carpal spine, but just a low, blunt, tuberculiform projection situated within a third of the length of the carpus from its articulation with the palm.

For convenience in comparing the gonopods of the several species discussed, figures of the gonopods and carapace outline of a specimen of *H. (P.) lindigiana* about the size of the Paris holotype are included in this account (Fig. 5, f-h). The specimen from which the drawings were

made and which lacks locality data was received in exchange from the Museum d'Histoire Naturelle, Paris.

CONCLUSIONS

Variation in American freshwater crabs seems not to have received the attention it deserves in authors' remarks upon their species, at least among the Trichodactylidae. In some species there are noticeable differences in external form (gonopods aside) between male and female, and between specimens of the same sex, for that matter, from young to old, and from small to large individuals—all vary in some degree in outline, spination, "sculpture," and convexity of the carapace. The gonopods alone seem to remain the one stable character upon which the specific distinctions in these brachyurans can be based.

Much the same situation obtains in the American crayfish genus *Procambarus*, which is being intensively studied by Dr. Horton H. Hobbs, Jr., Smithsonian Institution senior zoologist. He tells me that in this genus the mature male gonopods afford the only reliable character by means of which its species can be distinguished from one another. Indeed, some are so much alike that it is impossible to tell them apart without recourse to the gonopods. These, moreover, seem not to vary to any appreciable extent from the norm, no matter what the external morphology of the species may otherwise exhibit in the way of similarity or variability.

These observations are certainly applicable to some of the freshwater Brachyura of the Americas. For their precise identification, as with the North American procambarids, figures of the gonopods are a most essential part of every specific diagnosis or description. The brief descriptions and diagnoses of some preliminary announcements of new subspecies, species, subgenera, and even genera can be of but limited value in characterizing such taxa in the absence of illustration of the gonopods if recourse cannot be had to the types, if mature males, or to specimens that have become established as valid male representatives of the female types.

In this connection, I wish to commend several well illustrated reports concerned with the Latin American freshwater

crabs, for in them are figured the gonopods of most of the species with which the authors dealt at the time: Smalley, 1964a, b, c; Rodríguez, 1966a, b; Bott, 1956. To complete the characterization of Dr. Smalley's subgenus *Achlidon* [1964b], of which *Pseudothelphusa agrestis* Rathbun, 1898, is the type, the opportunity is here taken to publish a more detailed drawing, prepared some time ago, of the gonopods of that species than accompanied its original description (Fig. 6, a-d).

Long before Dr. Pretzmann described *V. (V.) piriformis* my interest in variation, as observed in these Colombian freshwater crabs, had been aroused by the differences noted in the general appearance of their carapaces, and, more particularly, in the armature of their anterolateral margins. This armature may vary from the very clear-cut, sharp spines of the smallest male of *V. (V.) piriformis* (?), which lacks abdomen and gonopods (Fig. 3d), to one in which the spining has become almost wholly obsolescent, as in the largest male (No. 23) (Fig. 3e).

In the largest male the extra-orbital angle is no more than tuberculiform, if it can be so described; following this, and corresponding each to the relative position of the spines present in the smallest male, the lateral margin of this specimen has mere blunt-angled notches, diminishing from front to back to the last, or fifth, one, which is so slight that it does not engage one's fingernail drawn along the smooth and no more than undulating margin at this level of the carapace.

This progressive reduction in size and prominence or obsolescence of the lateral spines seems to go hand in hand with the increase in size (and age?) of the males of this species and at least one other in the collections of the U. S. National Museum.

As early as 1926 Dr. Mary J. Rathbun noted on a label placed in a bottle of *Trichodactylus (Dilocarcinus) pictus* (<*Holthuisia pictus*) from Acequia, Tucumán, Argentina (USNM 125134): "Spines of largest specimen singularly aborted." There were three males in the lot. The carapaces of the largest (44.2 × 52.6 mm) and smallest (33.5 × 39.6 mm) of these have been drawn in outline (Figs. 7e and f), as well as the carapace of an intermediate-sized specimen (USNM 119881,

43.6 \times 50.6 mm) from Ovata, Tucumán (Fig. 7d) in order to show the progressive reduction in prominence of lateral spines that seems to accompany growth in size in this species. The largest of Miss Rathbun's *pictus* male specimens does have sharp-spined extra-orbital angles, and the fifth or most posterior "angle" on the right lateral margin of the carapace, counting from the extra-orbital, is armed with a sharp, quite slender spine, adventitious perhaps at this age or size (growth stage) of this male. The gonopods of the Ovata individual are figured (Fig. 7, a-c). These appendages, except for relative size, are alike in all three.

One wonders in how many other trichodactylid species, given a sufficient series, such a diminution, regression, or abortion of the marginal armature of the carapace occurs. With the females, at least in *V. (V.) piriformis*, the situation is quite otherwise. There is no reduction in the relative size of the lateral spines from the small to the large specimens; indeed, the very largest female in the collection (No. 22, 54 \times 59.2 mm) is very conspicuously sharp-spined!

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LITERATURE CITED*

- BOTT, RICHARD. 1956. Decapoden (Crustacea) aus El Salvador. 3. Süßwasserkrabben (*Pseudothelphusa*). Senck. biol. 37 (3/4): 229-242, pls. 28-35.
- PRETZMANN, GERHARD. 1965. "Vorläufiger Bericht über die Familie Pseudothelphusidae." Sonderabdruck aus dem Anzeiger der math.-naturw. Klasse der Österreichischen Akademie der Wissenschaften, Jahrgang 1965, Nr. 1, pp. 1-10. (Sitzung der mathematisch-naturwissenschaftlichen Klasse vom 14. Jänner 1965.)
- . 1967. Über einige südamerikanische Süßwasserkrabben (Pseudothelphusidae). Vorläufige Mitteilung. Entomologisches Nachrichtenblatt, 14. Jahrgang, Nr. 2, Feber 1967, pp. 23-26.
- . 1968a. Neue südamerikanische Süßwasserkrabben (Vorläufige Mitteilung). Entomologisches Nachrichtenblatt 15. Jahrgang, Sonderheft, Feber 1968, pp. 1-15.
- . 1968b. Weitere neue südamerikanische Süßwasserkrabben (Vorläufige Mitteilung). Entomologisches Nachrichtenblatt, 15. Jahrgang, 2. Sonderheft, 19. April 1968, pp. 1-8.
- . 1968c. Die Familie Trichodactylidae (Milne-Edwards, 1853) Smith 1870 (Vorläufige Mitteilung). Entomologisches Nachrichtenblatt, 15. Jahrgang, Nr. 7-8, 14. Juni 1968, pp. 70-76.
- RODRÍGUEZ, GILBERTO. 1966a. The freshwater crabs of the genus *Pseudothelphusa* from northern Venezuela and Trinidad. Zool. Meded. Leiden, 41(6): 111-135, text figs. 1-10, pls. 1-7.
- . 1966b. Three new species of *Pseudothelphusa* from Venezuela. Zool. Meded. Leiden, 41(19): 259-267, text figs. 1-4, pls. 1-3.
- SMALLEY, ALFRED E. 1964a. A terminology for the gonopods of the American river crabs. Syst. Zool., 13(1): 28-31, text fig. 1, A-H.
- . 1964b. The river crabs of Costa Rica, and the subfamilies of the Pseudothelphusidae. Tulane Studies in Zoology, 12(1): 5-13, text figs. 1-17.
- . 1964c. Two new fresh-water crabs from Nicaragua. Ann. Mag. Nat. Hist. (13)7: 651-656, text figs. 1-8.

* All other pertinent references will be found in the papers here listed.